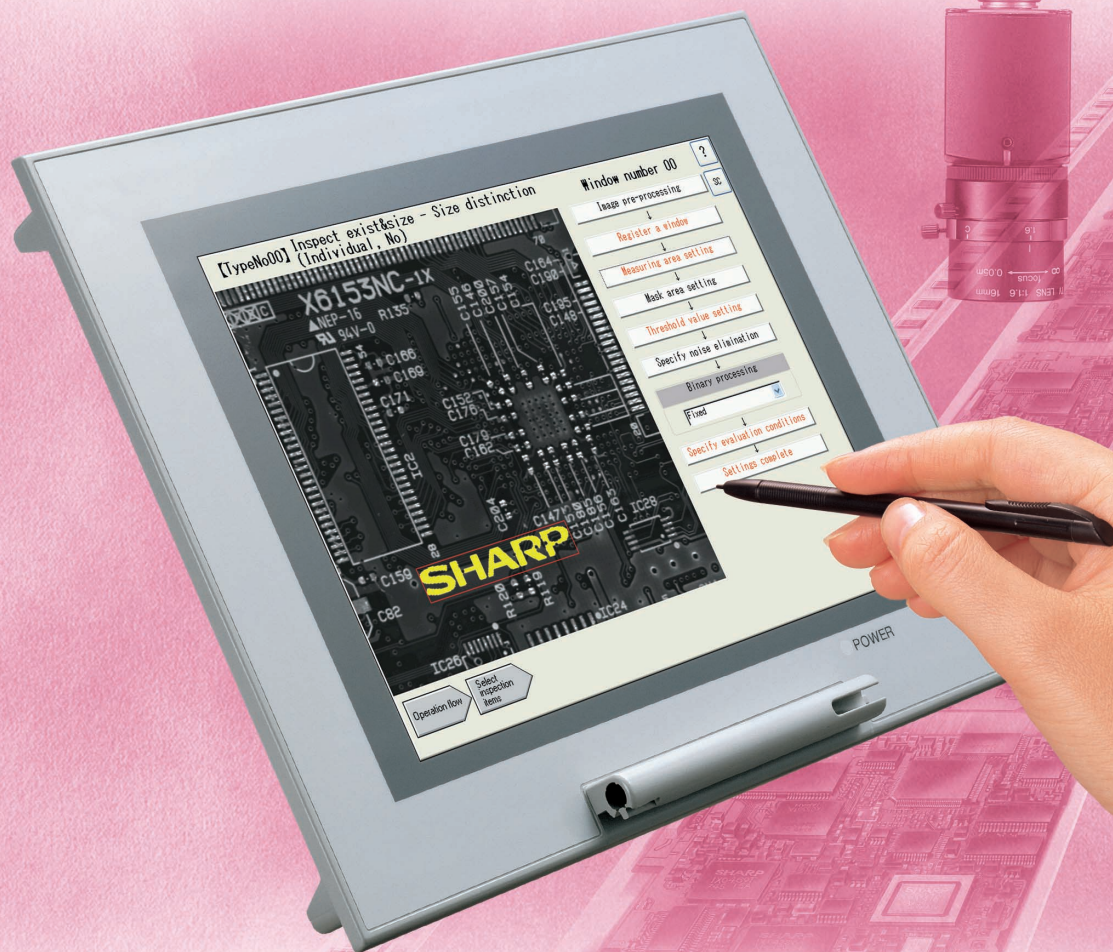


Image Sensor Cameras

Controller	IV-S51M
LCD monitor	IV-08MP

Image processing for various inspections and measurements can be easily made with user-friendly touch screen operated with finger or stylus pen.



VISUAL STATION

Next-generation image sensor camera “VISUAL STATION”



ISO-9001
certification
JQA-1385



Sharp Manufacturing Systems Co., Ltd.
Our headquarters has received
ISO14001 certification
(environmental management system).



JAB
EMS Accreditation
RE 009

VISUAL STATION is the next-generation image sensor camera that pursues usability, visibility, and comprehensibility.

Complete range of functions
from equipment selection to maintenance



Only Sharp can offer you complete range of functions starting with equipment selection.

Inspections and measurements using an image sensor camera used to require a lot of experience and time of an operator to select equipment and set up the system. Now, Sharp's VISUAL STATION, the next generation image sensor camera, can integrate all the experiences and know-how of image processing experts into one unit. It offers the complete range of functions of image processing including operation and maintenance. Especially, new functions to support start set-up that used to take up man hours and labor are also integrated in this system. By simply following the displayed instruction and directly entering parameters in touch screen with a finger or a stylus pen, even a beginner can set up the camera easily and quickly. VISUAL STATION eliminates the deviation among individual operators in terms of the inspection/measurement results, and contributes to standardization and stabilization of inspection/measurement results, reduction of man hours and shortening of time.



**VISUAL
STATION**

Next-generation image sensor camera
“VISUAL STATION”

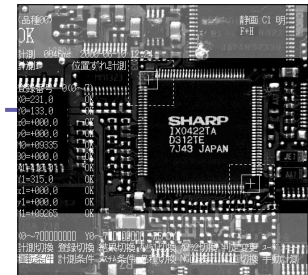
You can directly enter your parameters in touch screen.
Screen view shows operation procedure at a glance.

Easy pen-touch entry and new menu system Industry's first※

VISUAL STATION offers you easy LCD touch screen operation. By simply following the displayed instruction, even a beginner can set up the camera easily and quickly. Newly employed menu system can realize operability and handiness better than ever.

It used to be...

- Troublesome and time consuming to enter the parameters and set-up items by moving cursor with set-up key pad,
- Difficult for a beginner or a less-experienced operator to know how and what to set up, and
- Hard to see the screen with the inspection screen view and the menu overlapped.

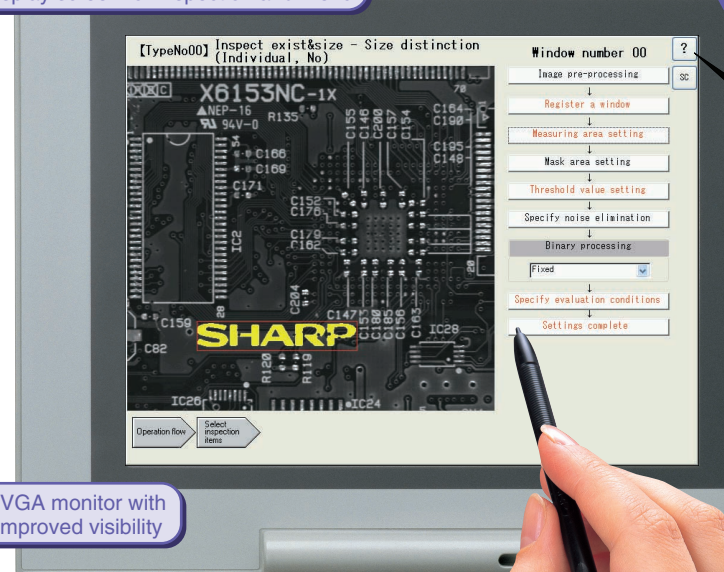


Conventional screen view
(poor visibility with mixed display)

With our VISUAL STATION...

- Even a beginner can start the operation without any difficulty by simply following this flow system.

Easy-to-see screen view with a split display screen for inspection and menu

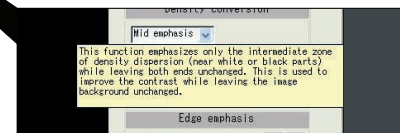


SVGA monitor with improved visibility

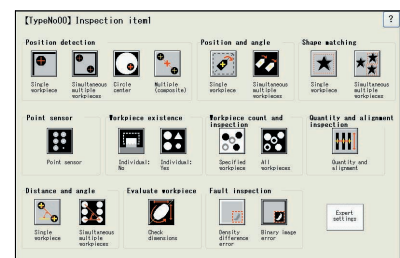
You can see what to start with, end with and what to set up at a glance.

* Essential items to set up will be highlighted in orange.

- Help function can quickly give you the definition of unknown word on the screen.

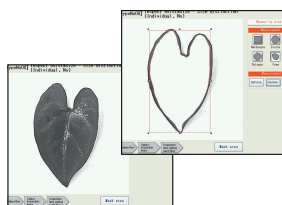


- New menu system helps you select from inspection purpose.



You can select the appropriate menu without having image processing expertise.

- Realized free-shape drawing in the measuring area.



Industry's first

Measuring area can be freely and quickly drawn with stylus pen.



Measuring area can be designated in detail by each dot by using stylus pen or specifying numeric values. Suitable for accurate depiction.

This is suitable for...

- Existence of work and size inspection
 - Inspection for missing dot of LCD, existence of debris
 - Inspection for existence for flash of molded item
 - Inspection for existence of connector pin
- The number of projected parts and the width, interval, etc. of the alignment
 - IC lead width inspection
 - Inspection for intervals, number, and diameter of BGA solder ball
- Shape degree of match inspection
 - Shape of ball bearing/gear
 - Inclination/misalignment of labels and seals
- Workpiece counting
 - Workpiece counting of confection before wrapping
 - Inspection for missing capsule/tablet



Extraction of appropriate binary processed image requires no experience or technical knowledge of user.

Image processing procedure automatic generating expert

Industry's first*
(patent pending)

VISUAL STATION is equipped with Image processing procedure automatic generating expert developed based on the know-how of image processing experts, and the analysis and collection of academic data. By simply entering the parameters according to the instruction on the screen and draw round the inspecting area with stylus pen, processing procedure will be automatically generated and executed. Image will be quickly extracted. Reducing the personal difference and shortening the time, this system improved efficiency and uniformity of the work.

It used to be...

- Difficult for a less-experienced operator to know what kind of image processing should be conducted in what procedures in order to obtain an appropriate inspection image,
- Difficult to stabilize the quality since there were some deviations when setting up image processing parameters among individual operators, and
- Uncertain and time consuming to set up correct parameters for image processing.

With our VISUAL STATION...

- Drawing around the inspecting area and entering inspection purpose and parameters will automatically generate appropriate image processing procedure and execute binary processing.

Automatically generate smoothing
Binary processing
Expansion
Contraction
Area filter, etc.

Automatically generates and executes appropriate image processing.

The identified inspecting area can be automatically extracted.

Automatically correct distortion of image. (Patent pending)

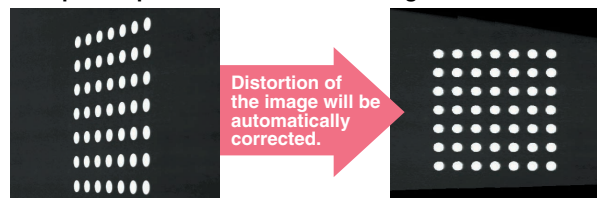
Camera inclination and lens distortion automatic correction function

It used to be...

- Difficult to conduct stable image detection when the camera was inclined and created distortion in the image, and
- Difficult to eliminate the errors caused by the lens distortion depending on the inspected position.

With our VISUAL STATION...

- Automatically correct measurement error caused by inspected position resulted from image distortion.



Place the separately-sold reference plate for distortion correction under the camera, and enter the correct scale distance, then execute.

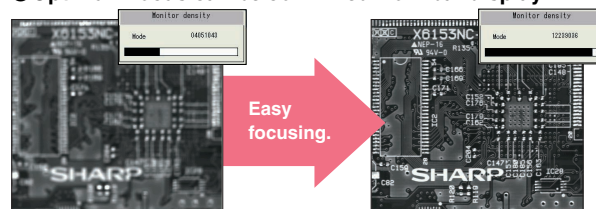
Correct focus position will be informed for clearer image. Informing function of optimum focus

It used to be...

- Relying on the individual operator's sense to focus, not knowing whether it was the optimum focus.

With our VISUAL STATION...

- Optimum focus can be confirmed from bar display.



Turn the focus adjuster to the point at which the bar display shows the maximum value.

High-quality IV assets are inherited, and S search and lighting control are newly added.

High basic performances together with various maintenance functions

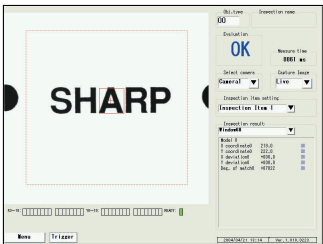
New algorism (S search) reinforces search function.

New algorism reinforces the functions of conventional gray search (correlation for normalization). This system provides a stable search even if the workpiece you wish to search is partially hidden or chipped.

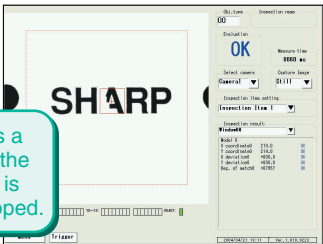
(Patent pending)

It used to be...

○Difficult to conduct the stable search unless the workpiece was perfectly visible and captured.



With our VISUAL STATION...



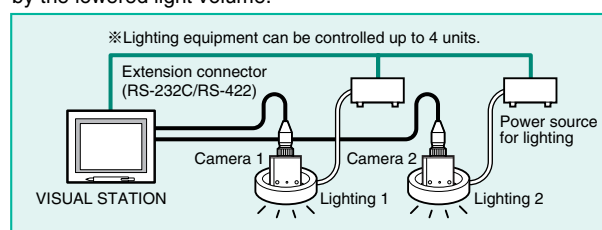
This system provides a stable search even if the workpiece to search is partially hidden or chipped.

Light level of the image is kept consistent by light level automatic adjustment function.

During the operation, the light volume on the workpiece used to be inconsistent due to the changes of surrounding environment. Inconsistency of the light volume could change the image's light level, and hinder the stable inspection/measurement results. VISUAL STATION uses light level automatic adjustment system with illuminance monitoring function that provides the stable screen image with the consistent light level.

Reliable maintenance with lighting control

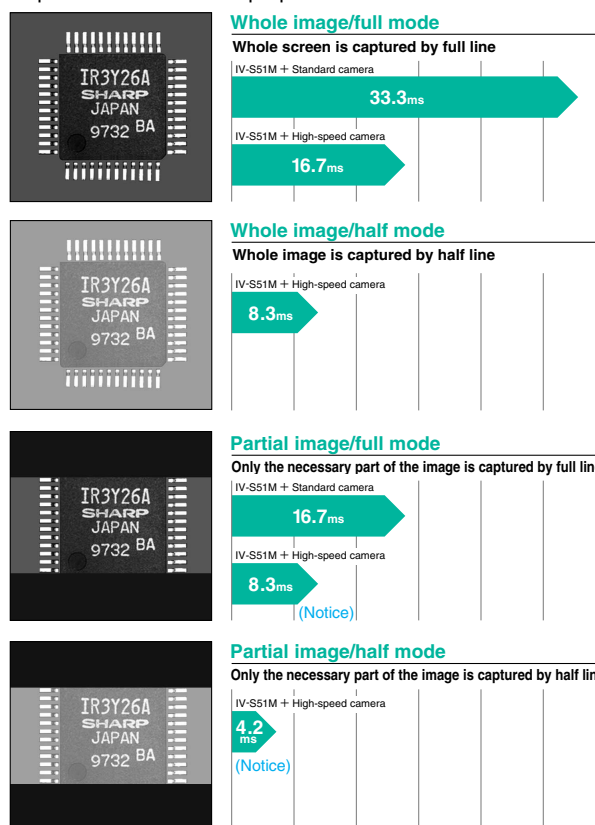
VISUAL STATION is equipped with lighting control function. When lighting power source for lighting control is used, general-purpose serial interface can control ON/OFF of the lighting, diagnose the light volume, and remotely control the lighting volume. This function allows you to prevent from improper detection caused by the lowered light volume.



●Contact our sales representative for the recommended lighting power source.

High speed camera and partial image capture function greatly reduce the inspection time.

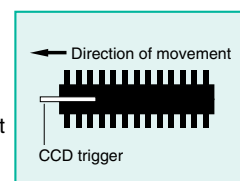
VISUAL STATION can work with double-speed/quadruple-speed cameras with progressive system CCD. Partial image capture function speeds up the image-capturing. And further reduction of time can be possible by selecting from 4 modes to suite your inspection/measurement purpose.



- * Partial image is captured when 240 lines out of 480 lines are read.
- * Standard cameras: IV-S30C1/IV-S30C2, high speed camera: IV-S30C3/IV-S30C4
- * Full mode: odd/even lines are read, half mode: only odd lines are read.
- (Notice) Image-capture time will differ depending on the position of partial image (max. 0.4ms in the case above)

CCD trigger function requires no external sensor

With window for trigger set up, no need for any external sensor even for moving measurement. You can select your trigger detection method from binary processing, average light level and gray search. Gray search can be used for the workpieces for which setting of the light range is tricky.





High speed network that allows measured data and NG images to be sent to upward personal computer

Equipped with Ethernet interface

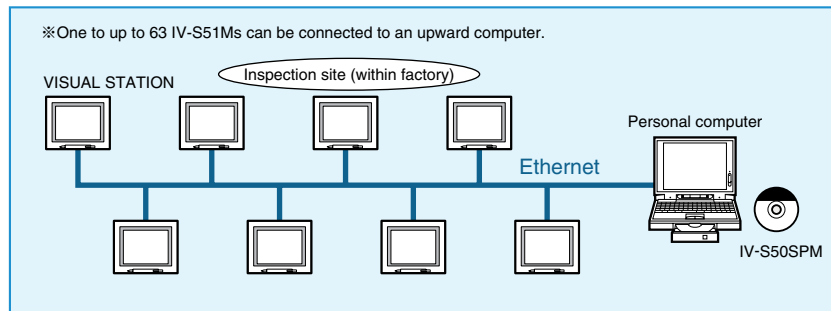
VISUAL STATION is equipped with Ethernet interface that allows fast communication to upward personal computer. You can see measured data and NG images at a personal computer which is located away from the inspection site. Parameter setting support software (IV-S51SPM) can be installed at a personal computer.

It used to be...

- Time consuming to confirm the inspection status and conduct defect analysis, making it so difficult to provide the prompt feedback.

With our VISUAL STATION...

- Measured data and NG images from multiple IV-S51Ms can be immediately sent to upward computer to reduce the number of NG products.



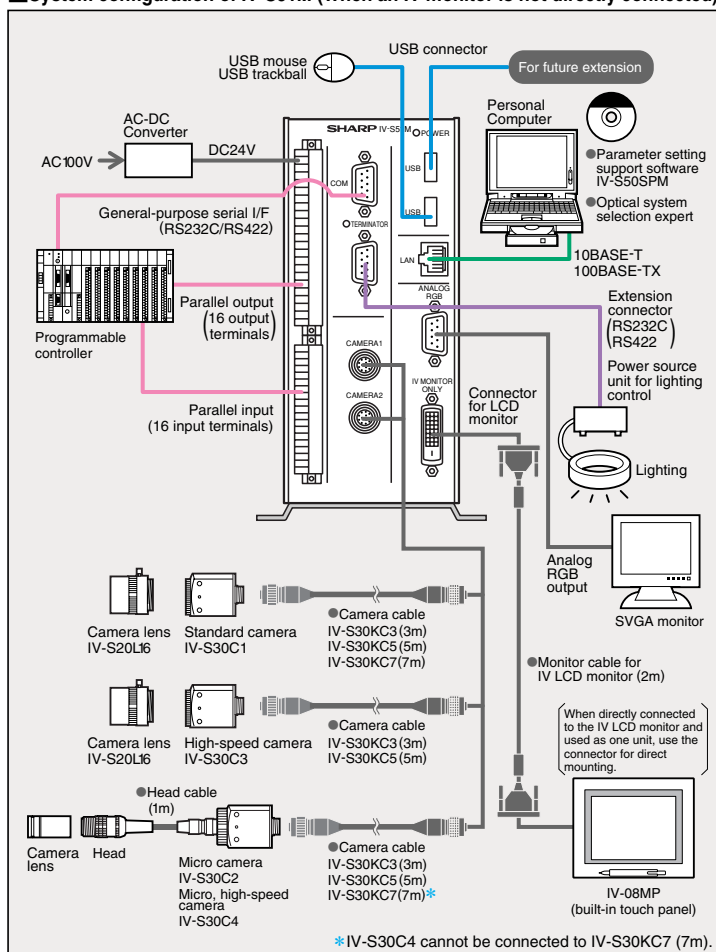
Not for sale Contact our sales representative for further details of this product.

Parameter setting support software for IV-S51M series, IV-S50SPM

This support software can be used for management and analysis of inspection results.

- The set parameters can be read out.
- Equipped with data collecting function that forwards measured data and NG images to upward computer.
- Forwarded screen view can be read out.
- Equipped with version upgrade function.

System configuration of IV-S51M (When an IV monitor is not directly connected)



IV-S51M Product line

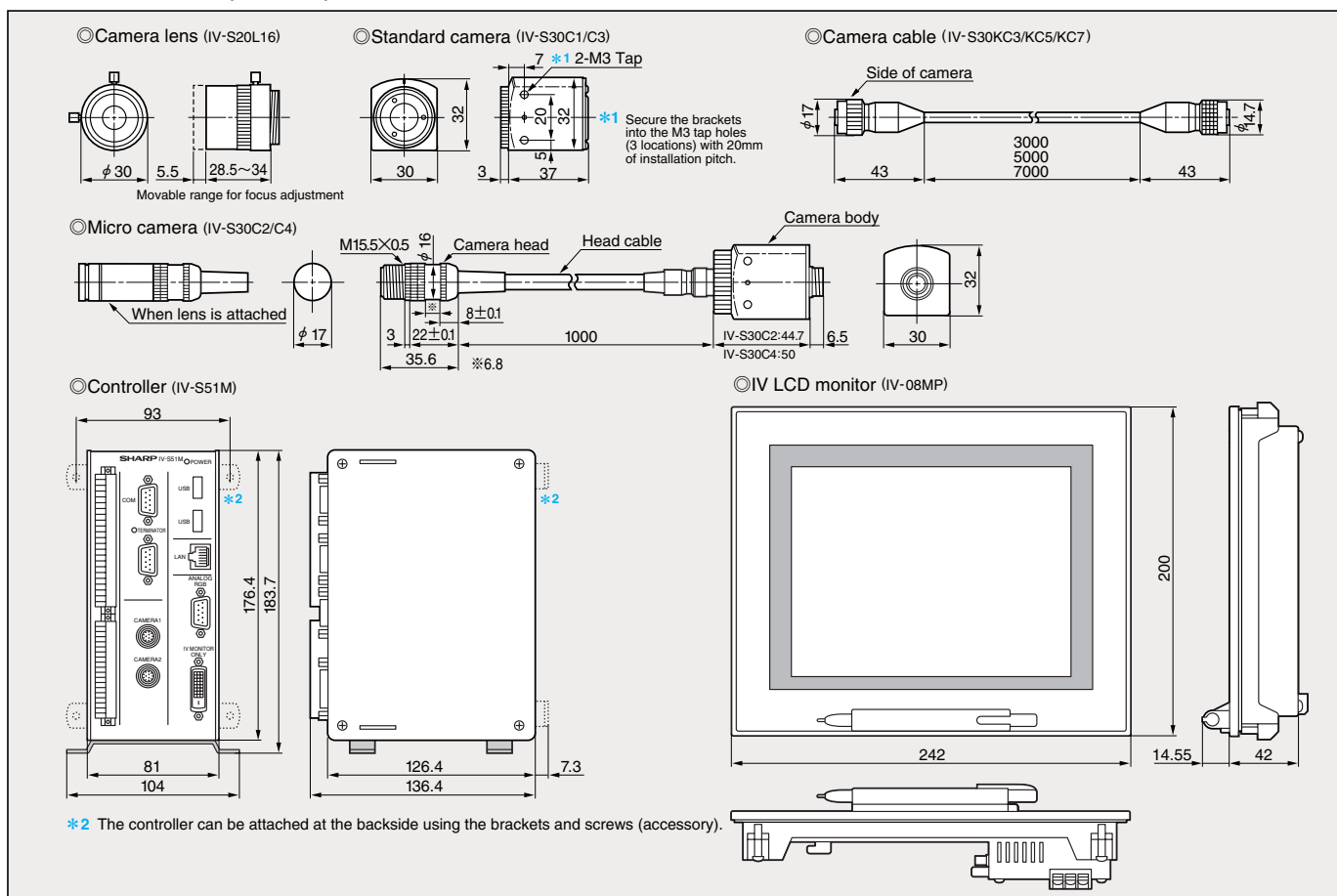
Item name		Model name	Specification or details
Controller		IV-S51M	Monochrome 256 gray level, 64 object types, Image processing procedure automatic generating expert function (binary processing), hidden workpiece search by new algorithm (S search)
Camera	Standard	IV-S30C1	C mount
	Micro	IV-S30C2	φ17 mm mount
	High speed	IV-S30C3	C mount, 2X, 4X
	Micro, high speed	IV-S30C4	φ17 mm mount, 2X, 4X
Camera lens		IV-S20L16	C mount lens with a 16 mm focal length
Camera cable		IV-S30KC3	Cable for IV-S30C3/C1 camera, 3 m
		IV-S30KC5	Cable for IV-S30C3/C1 camera, 5 m
		IV-S30KC7	Cable for IV-S30C1 camera, 7 m
IV LCD monitor		IV-08MP	8.4 TFT color LCD with a built-in I/F touch panel (with stylus pen) for SVGA. The monitor can be directly mounted to IV-S51M. Screen image of display has 65,000 colors.
IV LCD monitor cable		IV-S50MC2	Cable for IV LCD monitor (IV-08MP), 2m
Parameter setting support software (not for sale)		IV-S50SPM	Control/analysis of inspection data can be set up on the Window s screen (runs on Windows2000/XP/98).
Optical system selection expert (not for sale)		—	Enter the inspection, purpose, viewing field, and distance, then the recommended optical system type will be displayed.

©Mixed use of high-speed type and standard type is not supported.

VISUAL STATION offers the various installation options to suit your installed location and environment. The monitor and the controller can be connected directly or with monitor cable, and the connector can be placed either vertically or horizontally. (Use the accessories angle brackets for vertical/horizontal placement.)



External dimension (Unit: mm)



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Specifications of IV-S51M controller

Image sampling system		Monochrome 256 gray level	Optical system maintenance	Lighting adjustment	Adjustment of light volume
Image memory		One screen for one captured image per camera		Light level automatic adjustment	Monitoring illuminance → shading diagnosis → optical system automatic adjustment (1. light volume, 2. shutter speed)
No. of assignable object type		64 object types	Other functions	Displaying measuring time, monitoring illuminance, switching language between Japanese and English, running screen lock function, and change image display (through/freeze)	
No. of camera to be connected		Up to 2 cameras			
Image processing		Gray, binary conversion	Image processing procedure automatic generating expert (binary processing)	Object: position detection, position & attitude angle, size inspection, workpiece count inspection, distance & angle measurement, workpiece dimension measurement, and defect inspection	
Image capture time	Standard camera	33.3 ms			
	High speed camera	16.7 ms (full mode), 8.3 ms (half mode)			
Gray search time		8ms (model: 64×64, search area: 256×256, when the speed is prioritized)	Micro PLC section	Timer	16 points (TM0 ~ TM15), timer setting range (0.01 ~ 9.99 seconds), (down counter)
Rotation correction time		142 ms (conditions: 360°, freeze, priority on speed, size 128×64, search area 512×480)		Counter	16 points (CN0 ~ CN15), counter setting range (1 ~ 999 seconds), (up counter)
Gray search, edge detection precision		Sub-pixel	IPU external interface	Parallel interface	Input: 16 points (X0 ~ X15), DC12/24V 7mA (DC 24V) Output: 16 points (Y0 ~ Y15) DC12/24V 80mA (open collector)
Gray image pre-processing	Gray level change	Histogram widening		Serial interface	RS232C/RS422(2-wire/4-wire system), (2.4 ~ 115.2kbps) upward calculator, PLC
	Noise elimination	Smoothing (average/center)	Extension terminal	RS-232C/RS-422 (2-wire system only)	
Outline extraction		Edge extraction (primary differentiation, secondary differentiation), horizontal edge, vertical edge	Computer link		Compatible with SHARP, OMRON, Mitsubishi, and Yokokawa models.
Binary threshold value		Fixed and threshold value correction (variation difference/variation rate)	Measurement start input		CCD trigger
Expansion, contraction, and area filter		Expansion → contraction → contraction → expansion, contraction → expansion → expansion → contraction, space filter	Internal trigger		Trigger input (parallel interface), serial trigger, and manual trigger (for testing)
Positional correction method		X/Y correction, rotation correction	Power supply input		+24V, 0V FG
Window shape		Rectangle, circle, oval, polygon, and free shape	Parallel interface		Common for input: 1 point
Inspection program	Position detection	Object: 1. single workpiece, 2. multiple work pieces can be processed simultaneously Output: coordinate			Interrupt input (trigger) 1 point
	Position & attitude angle	Object: 1. single workpiece, 2. multiple workpieces can be processed simultaneously Output: coordinate, angle			Input 15 points
	Shape degree of match inspection	Object: 1. single workpiece, 2. multiple workpieces can be processed simultaneously Output: Degree of match			Common for output: 1point
	Point sensor	Output: yes or no	READY 1 point		
	Existence of work and size inspection	Measurement: 1. no individual workpiece, 2. individual workpiece Output: area	HALT output 1 point (interlocking with watchdog timer)		
Workpiece counting		Object: 1. all the workpieces, 2. designated workpieces Output: number of object detected	Output 16 points		
No. of projected parts and alignment		The number of projected parts, interval, width (point alignment)	Lighting control	Control function	Dimmer function, lamp ON/OFF (LED), shutter ON/OFF (halogen)
Distance & angle measurement		Object: 1. single workpiece, 2. multiple workpieces can be processed simultaneously Output: distance (between 2 points/X coordinate/Y coordinate), angle (3 points/2 points against vertical line/2 points against horizontal line)		Number of control	4 systems, 2 controls/1 system
Workpiece dimension measurement		Output: number of workpiece, total area, area for each label, diameter of the projection width, circumference length, main axes angle	Control port	Parallel I/F or RS-232C/RS-422	
Number of measurement program		Maximum 8 measurements/type (measurement item 0 - camera 1, measurement item 0 - camera 2, and measurement item 1 ~ 6)	Power supply voltage/ power consumption		DC24V (±10%) 30W
Arithmetic operation		Four basic operations (+, -, ×, ÷), root, absolute value, TAN, ATAN, maximum, minimum, average, and total	Operation ambient temperature/ atmosphere		0 ~ 45 °C/35 ~ 95% RH (non-condensing)
NG image memory function		Maximum 128 images (8 whole scenes)	Storage ambient temperature/ atmosphere		- 20 ~ 70 °C/35 ~ 95% RH (non-condensing)
Calendar/timer		Year, month, day, hour, minute and second	External dimension/weight		81mm (W) × 125mm (D) × 175 mm (H) (protruding portions are not included), approx. 1.5 kg
Optical system configuration setting	Image adjustment 1	1. Focus adjustment, 2. contrast adjustment	HMI External interface	USB host	USB 1.1 specification, 2 channel
	Image adjustment 2	1. Image distortion diagnosis & compensation, 2. calibration		LAN	10/100 base-TX
				Image output	VGA output port 1 point, IV LCD monitor output 1 point
			Operation input		Touch panel, and commercially available USB mouse
			Image output		SVGA (800×600×24bpp) analog output IV LCD monitor (800×600×18bpp) digital output

Specifications of camera

		Standard IV-S30C1	High speed IV-S30C3	Micro IV-S30C2	Micro, high speed IV-S30C4
Optical system	Lens mount method	C mount		φ17 mm mount	
Picture taking element	Method		Interline transmission method, monochrome CCD		
	Reading system		Full pixel type, partial image scanning is available.		
	Reading time	Standard	33.3 ms *1		
		High speed	16.7 ms (full mode), 8.3 ms (half mode) *1		
	Size		1/3 inch		
Shutter	No. of effective pixels		52 (horizontal) × 480 (vertical)		
	Pixel shape		Tetragonal lattice		
	Shutter speed		Settable between 1/30 ~ 1/10,000 sec. (for each object type)		
	Method		Random shutter		
Connector		Round, 12-pin, male connector			
Connection to controller		Connection using custom camera cables (IV-S30KC3: 3m, IV-S30KC5: 5m, and IV-S30KC7 *2: 7m)			
Operation ambient temperature/ humidity/atmosphere		0 ~ 45 °C/ 35 ~ 85% (non-condensing), free from corrosive gases or dust			
External dimensions	Camera body section	30 (W) × 32 (H) × 40 mm(D)		IV-S30C2: 30 (W) × 32 (H) × 50mm(D) IV-S30C4: 30 (W) × 32 (H) × 44.7mm (D)	
	Head section	—		φ17 mm × 35.6mm	
	Head cable	—		1 m	
Weight		50 g (not including the lens)		IV-S30C2: approx. 125 g (approx. 12g for head section) IV-S30C4: approx. 140 g (approx. 13g for head section)	

Specifications of camera lens (IV-S20L16)

Focal distance	16 mm
Maximum f-stop	1.6
Aperture range	1.6 ~ 16 close
Focal range	50 mm ~ ∞
Filter installation diameter	M25.5, P = 0.75, U1
Mount system	C mount
Compatible cameras	IV-S30C1/C3

*1 Variable by reading partial image.

*2 IV-S30C3/C4 can not be connected to IV-S30KC7(7m).

- Windows 2000/XP/98 are registered trademarks of the Microsoft Corporation, USA. - Company names, product names, and merchandise names described in this leaflet are the trademarks or registered trademarks of each respective company. - The specifications may be changed without prior notice. The color of the actual product may vary from that shown in this brochure. - Some models in this leaflet may be out of stock. Please contact your sales agent for selection of currently available models. - Images used in the leaflet may be different from the images actually displayed on the monitor.



To use this device effectively and safely!

- Make sure to read the instruction manual before use. Make sure to supply the specified power and voltage.

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4-1-33 Atohe Honmachi, Yao, Osaka, 581-8581, Japan
TEL: +81-729-91-0587 FAX: +81-729-91-0626

Information about SHARP control equipments is available at our web site <http://sharp-world.com/sms/>

The details in this pamphlet were correct as of April 2004.

SMS-068E 10803 O.1